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insomuch that I cut a little of the upper end of the branch which was very tender, and then indeed I saw a little moisture appear at the end that was in *vacuo*, but that enough only to form one drop; and there appear'd no bubble of Air. Then I cut the branch yet a little lower, and then there was form'd one drop of water at the end that was in *vacuo*, but it fell not. And having cut the branch yet a little more, the drop of water fell down in *vacuo*. This shews, that they were not the *valves* of the plant that hindered the water from passing whilst the branch was entire; but rather that it was the great tenderness of the leaves, suffering themselves to be compress'd by the pressure of the Air, and that so the water could not insinuate it self between their parts.

An Account of some Books:

- I. *Francisci Willughbeii de Middleton Armigeri, è Reg. Societate, ORNITHOLOGICÆ Libri tres; in quibus Aves omnes hactenus cognitæ, in methodum naturis suis convenientem redactæ, accuratè describuntur; Descriptiones Iconibus elegantissimis & Vivarum Avium simillimis, æri incisæ, illustrantur: Totum opus recognovit, digestit, supplevit Joh. Rajus, pariter è Soc. R. Sumptus in Chalcographos fecit Illustriss. D. EMMA WILLUGHBY, vidua. Londini, Impensis Joh. Martyn, Typographi Soc. Regiæ, ad insigne Campanæ in Cœmeterio D. Pauli, 1676, in fol.*

AS the person, that hath review'd, methodized and supplied this Work, Mr. *John Ray*, hath given to the worthy and learned Author thereof his just Elogy in the Preface; so we cannot but very thankfully acknowledge not only the Industry, Care and Accuracy of the said person in digesting and perfecting it, but also the Bounty of that Excellent Lady, the Authors Relict Widow, enriching the same with so vast a Number of Elegant and Costly Figures; whereby She hath indeed immortalised Herself as well as her Deserving Consort, and manifested to the World, that in a time when many stain their lives by unworthy pleasures, she knew how to adorn hers by the exercise of Ingenuity and Vertue: In the doing of which, as she hath put a lustre upon herself, that makes her outshine many of her Sex; so she hath rais'd in Us very great hopes, that she will continue the same nobleness in the publication of the rest of the *History of Animals*, mention'd in the Preface.

Having

Having paid this small Tribute to the merit of this Generous Lady, I shall now proceed to take notice of the Work it self; and *First*, of the design thereof, which is not to give Pandects of Birds, or to collect indiscriminately what hath been already published, whether true or false, on this subject; but to illustrate and put into good order the History of Birds, *partly* by describing the Birds themselves upon Ocular inspection, *partly* by borrowing the description of those, of which the Author and Publisher themselves could not get a sight, from the best Writers upon this Argument: Endeavouring principally, to describe and difference all the known *species* of Birds, and to reduce them to their several *classes*, and thereby to take away that confusion and obscurity, which this History hath hitherto laboured under.

Secondly, The Work it self is divided into three Books; whereof the *first* treats of Birds in general; the *second*, of Land-fowl; and the *third*, of Water-fowl.

Concerning the *first*, in it are described the principal both *Outward* and *Inward* Parts of Birds, such as are either peculiar to them, or shew a peculiar structure and use in them. In the *external* parts, the Author observes, among other particulars, that the *Pectoral* Muscles in Birds are the thickest and strongest of all, serving for the motion of their Wings that require great strength; whereas in Man, the *Cruval* Muscles are stronger than those of his Arms; whence, if *Flying* were either possible or fit for Man, his legs, furnish't with a *succedaneum* to wings for compressing and beating the Air, would serve him better for that purpose, than his Arms. In the *Internal* parts, he notes, among many other things, the considerable difference there is between the *Brain* of Birds and that of Man and Quadrupeds; adapted in Birds more for the exercise of the Locomotive faculty, than for Imagination and Memory.

Discourfing in this Part of the *Generation* of Birds, he judgeth it highly probable, that their Females have in them, from the time of their being first born, all the Eggs or the Primordials of Eggs, that they shall lay as long as they live: which he thinks to be true of Human and all other Females; making the *Incubation* of the Eggs of Fowl to be equivalent to the *Gestation* or Bearing of other Animals; and calling the *Ovum* an *Uterus expofitus*, forasmuch as it ministers aliment to the *fetus* of those that are commonly call'd Oviparous, in like manner as the Womb doth in the Viviparous.

Treating

Treating of the *Age* of Birds, and of some of their observable proprieties and qualities, he notes, *that* they live long; *that* their structure somewhat resembles the built of a Ship; *that* some of them, as *Partridges* and *Pigeons*, lead a Conjugal life, and that of those Birds that do so, there are more Males than Females, as among those where one Male is sufficient for many Females, there are more Females than Males; *that* some of them are very ingenious, and imitate the Human voice, as *Parrots*, *Thrushes*, *Blackbirds*, *Jackdaws*, *Starlings*, *Nightingales*, of which last, and of *Parrots*, he relates very extraordinary things, p. 79, 161.

To all which he subjoyns some *Quare's* of particulars, further to be satisfied; and then takes notice of some Isles, Rocks and Cliffs about *England*, notable for great multitudes of Birds breeding therein.

He concludes this *first* Book with an accurate *Division* of Birds, and with a *Catalogue* both of such as do constantly abide in *England*, and such as come at one season of the year, and go away in another.

In the *second* Book, treating of *Land-fowl*, he considers *first* those that have *Hooked* Beaks and Claws; and *secondly* those that have them more *Straight*. The *former* are either *Carnivorous*, and of these, some intent upon their prey by day, others by night; or *Frugivorous*. Concerning the *Carnivorous* or Rapacious, he takes notice: 1. That, though *Aristotle* gives out, they fly solitary, when he saith, *καμψυνύχων ἐδὲν ἀγέλαϊον*; yet that holds not in all, seeing that *Vulturs* have been observ'd to fly in troops, fifty or sixty together. 2. That the Females of the Ravenous Birds are bigger, stronger, and of greater courage than the Males; Nature seeming to have been so provident as to furnish those Females with such advantages, upon the account that they must procure food not only for themselves but also for their young ones. 3. That whereas all other Birds make their own nests, if need be, and sit upon and hatch their own Eggs, the *Cuckow* makes use of other nests, deserts her Eggs, and leaves them to be hatched by other Birds. Of the *Frugivorous* he observes amongst other particulars: That, as *Quails* eat Hellebore, and *Starlings* Hemlock, without any harm to themselves; so *Parrots* not only eat innociously the seed of *Carthamus* or *bastard Saffron*, but also grow fat thereby; which yet is a Purgative to Man. To which he adds relations out

of *Clusius* of some uncommon *Parrots*, so docile, as to learn whatever they are taught by those that instruct them.

Amongst those that have *Straight* Beaks and Claws, he observes: That the *Cassaware* (as well as the *Pellican*) is without a tongue ; swallowing not only bits of Iron as the *Ostriches*, but also red-hot Coals ; yet not digesting the Iron, but voiding it whole, as the *Ostrich* also doth: That *Capons* may be made to keep, feed, call together, and cover under their wings young Chickens, just as Hens will do ; adding the method for accustoming them to it : That the Custom of making use of *Pigeons* for carrying of Letters is as ancient as the Siege of *Mutina* or *Modena*, in the time of *Hirtius* and *Brutus* : That *Pigeons-flesh* is good for Paralytical persons: That *Swallows*, distilled with some *Castoreum*, *Pyony* roots, and White-wine, are an approv'd remedy against the Epilepsy, &c. And so much of the *second Book*.

The *Third*, treating of *Water-fowl*, is subdivided into three parts : The *first* contains those Birds, that live *near* water, but not *in* or *upon* it. The *second*, those that live much *in* the water, being *Fissipeds* (having their toes sever'd,) and *long-shanked*, and of the amphibious kind, partaking of the nature of both those that live *near* water and swim *in* it. The *third*, those that are *Palmipeds*, whose toes are joyned together with a membrane. Of those that live *near* wet places, some again live upon *Fish*, or *Slime* (out of which they suck something that is oleose, and from thence yield a delicate flesh, as *Wood-cocks*, *Snipes*, *Curlews*, &c.) or on *Insects*. Of the *Piscivorous*, the *Stork* is by our Author noted to be seen in *England* only when he is driven thither by high winds or other accidents. The like is observ'd by *Faber* the *Lyncean* Academist, of *Italy* : Which may be somewhat wondred at, since 'tis certain, that *Storks* do, before the approach of Winter, pass away out of *Germany*, (where they summer in great numbers,) into warmer places, and yet not into *Italy*, which is contiguous to *Germany*, and much warmer than it. The *Penguin*, though it likewise lives on *Fish*, yet is said not to tast of it, as other *Fish-eaters* do: Besides, the same is observ'd to digg deep holes, like *Conies*, on the *Sea-shore*, and to make the whole ground thereabout so hollow, that the Seamen walking over it do often fall in knee-deep. The *Anser Bassanus*, the *Soland Goose*, breed ng in the Isle of *Fassa*, near *Edinburgh*, lays and hatches no
more

more than one Egg at a time. They come thither in Spring, and fly away in Autumn, but whither, is not known. The *Colymbus minor*, or *Didapper*, has such a structure of parts, that he moves much more easily under water than on its surface, or aloft: He raises himself from the water with great difficulty; but when he is got up into the Air, he can then continue his flight long enough: The *Swan* is very long-lived, and takes almost two moneths time in hatching her Eggs: And the wild kind of Swans have their wind-pipes passing into the *Sternum*, and there reflecting or turning back; the Use of which is thought to be, that when this Bird sometimes for near half an hour with his whole head and neck dives to the bottom for food, turning up his feet on high, there may then from that part of his wind-pipe, which is included in the said sheath of the breast, as from a repository, be furnish'd Air sufficient for so long a time of diving. The *Bernacle* or *Clakis*, of the *Goose-kind*, is not bred out of the rotten boards of ships, nor of fruit fallen from Trees into the Sea, nor of Sea-shells; there being no such thing as æquivocal generation in Animals; and those *Bernacles* being known by the experience of credible Observers to lay and hatch Eggs as other Birds do.

But if we should take notice here of all the curious and remarkable Observations, recorded in this excellent Work, we should then be obliged to fill up many of these Tracts with them alone. We must therefore, having only given the Reader a taste of them, refer him to the Author himself, who will doubtless satisfy his expectation and curiosity in innumerable particulars: Amongst them of the extraordinary melodious singing of some Birds; the annual Moulting of all Birds; the Medicins to be prepared out of some of them, and their very Excrements; the artificial Nests of many of them; the tasting of the *Indian Raven* of Nutmegs, on which he feeds; &c.

II. *The Comparative ANATOMY of the TRUNKS of Plants; together with an Account of their VEGETATION grounded thereupon, by Nehemiah Grew M. D. and Fellow of the Royal Society: Printed by the Assigns of John Martyn Printer to the said Society, for Walter Kittilby, in 8°.*

AS there hath been a very happy Concurrence of these two eminently Learned persons, Signor *Malpighi*, and our present Author Dr. *Grew*, both Fellows of the *R. Society*, in making and exhibiting their ingenious and accurate Beginnings * concerning the *Anatome of Plants*, and thereby giving a New Country of Philosophy; so they have both been very industrious in pursuing this subject, in many things confirming one anothers Observations, and in some few ones supplying one anothers defects; the particulars of which we shall rather leave to the sagacious and impartial Reader to find himself in perusing and comparing both their Books, than make a stay here to specify them.

Instead thereof, we shall present him *first*, with some generals of this Philosophical Mapp, and *then*, with the particulars represented therein.

In *general*, it is noted by our Author, that it will here appear, *that* there are those things which are little less wonderful within a Plant than within an Animal; *that* a Plant, like an Animal, hath Organical parts, some whereof may be called its Bowels; *that* every Plant hath Bowels of divers kinds, containing divers Liquors; *that* even a Plant lives partly upon Air, for the reception whereof it hath peculiar Organs. Again, *that* all the said Organs, Bowels, or other parts are as artificially made, and as punctually for place and number composed together as all the Mathematical Lines of a Flower or Face; *that* the Staple of the Stuff is so exquisitely fine, that no Silkworm is able to draw so small a thred; *that* by all these means the Ascent of the Sap, the Distribution of the Air, the Confection of several sorts of Liquors, as *Lymphas, Milks, Oyls, Balsoms*, with other acts of Vegetation, are all contrived and brought about in a Mechanical way.

In *particular*, we find in the *first* of the *two* Parts of this Book;

1. A Description of *six* several *Trunks* of Plants, as they appear to the *naked eye*, viz. of *Borage*, *Dandelyon*, *Colewort*, *Holy-oak*, *wild Cucumber*, *Endive*.

2. An accurate Description of several *Trunks* and parts of *Trunks*, as they appear through a good *Microscope*; which parts are, the *Bark*, the *Wood*, and the *Pith*. Of the *Bark* he describes the *Skin*, the *Parenchyma*, and the *Vessels*; the last of which he finds in the *Bark* to be alwaies and only *Sap-vessels*; which yet are specified and distinguish't one from another, both in the same Plant, and in the several *Species*'s of Plants, by many properties, which are not accidental, but such as shew the constant and universal design of Nature: Which he shews by the description of the *Barks* of several *Trunks*, viz. *Holly*, *Hazel*, *Barbery*, *Apple*, *Pear*, *Plum*, *Elm*, *Ash*, *Walnut*, *Fig*, *Pine*, *Oak*, *Sumach*, *Wormwood*. In some of which he finds *Sap-vessels* to be only *Lymphaducts*; in others, *Lymphaducts* and *Lactiferous*; in others, *Lymphaducts* and *Resiniferous*; lastly, in some, two kinds of *Lymphaducts*, and one of a sort of *Resinous*. To which he subjoyns an Answer to that curious Question, viz. if the *Stringy parts* of the *Bark* are made up of *Tubes*, what these *Tubes* themselves are made up of? And that done, asserts the Analogy betwixt the *Vessels* of an *Animal* and a *Plant*.

3. Having thus described the *Bark*, he proceeds to the *Woody part*; and here, in the several *Trunks* aforesaid, he considers their two general parts, namely the *Parenchymous* part or *Insertions*, and the *Vessels*: The *Insertions* much diversified according to the several *Species* of Plants, for number, position and texture: The *Vessels* have likewise much variety, yet are of two general kinds, namely, *Sap-vessels* and *Air-vessels*, whereas 'tis proper to the *Bark*, (as was intimated above) to have only *Sap-vessels*. Of both these kinds of *Vessels* he notes the variety, as to number, situation, and size; these affections being in no two *species* of Plants the same.

4. Lastly, he describes the *Pith*, first in general, and proves it to be, as to its substance, the same with the *parenchyma* in the *Bark*, and the *Insertions* in the *Wood*: And then, he observes both the variety of its *size*, being not the same in any two branches, represented by him; and its being compounded of two parts, a *Parenchyma* and *Sap-vessels*: The *Parenchyma* made up of *Bladders*, of very different

different sizes and shapes in different Plants, and being of such a texture, that the sides of the greater bladders are compos'd of lesser; in the same manner as the *Sap-vessels* are but greater *fibers* made up of lesser.

To clear the better all he hath discoursed of the structure of a Plant, he resembles the whole *Body* of it to a piece of fine *Bone-lace*, at such time as 'tis wrought upon the Cushion. For, *saith he*, all the *Parenchymous* parts, as the Pith, Insertions, and Parenchyma of the Bark, are nothing else but *Lace-work*; the *Fibers* of the Pith running horizontally, as do the *threads* in the Lace, and bounding the several *Bladders* of the Pith and Bark, as the *threads* do the several holes of the Lace; and making up the *Insertions* without Bladders, or with very small ones, as the same *threads* likewise do the *close* parts of the Lace; which they call the *cloth-work*: And lastly, the *Vessels*, standing *perpendicularly*, run cross to the *horizontal* fibers; even as in the Lace the *Pins* do the threads. And this he makes to be the true texture of a Plant, and the general composure, not only of a *Branch*, but of all the other parts, from the seed to the seed.

To proceed to the *second* part of this Book, which gives an Account of the *Vegetation* of Trunks, grounded upon the foregoing Anatomy, and shewing the *Use* that may be made of the same in order to explicate the manner of *Vegetation*; the chief Heads, to which this whole matter is reduced, are these seven; *viz.*

1. The *Motion and Course of the SAP*; where he observes *two* kinds of Bleeding in the Plants; gives the causes of both; together with the cause of the Sap's Ascent.

2. The *motion of the AIR*; that it first enters the Plant by the Trunk, but chiefly by the Root, and is thence in a peculiar manner distributed throughout the whole Plant. Where he notes the use of the *Insertions* herein, and compares this use with that of the Membranous parts of the Lungs.

3. The *Structure of the PARTS*; where he explains the Union of the *Bark* to the *Body* of the Tree, with the cause of it: Considers the various Surface and Falling off of the Bark; the lessening of the *Pith* in the Elder branches; the ruptures of the Pith, and for what ends made; further, how the *Air-vessels* come to be less in the *Trunk* of the same Plant than in the *Root*; and those of the first year usually much less than those of the years following;

as also, how the *Air-vessels* come to be formed alwaies late in the year.

4. The *Generation of LIQUORS*, depending upon the Structure and Formation of the Parts: Where he shews, that the concurrence of *two* specifically distinct Liquors is as necessary to *Nutrition* in *Plants* as in *Animals*; and that the *Vessels* are the chief *Viscera* of a Plant; the *Viscera* of an Animal being but *Vessels* conglomerated, and the *Vessels* of a Plant, but *Viscera* drawn out at length. To which he adds a particular explication, how a *Winy Sap* is made, how a *Resinous*, *Oily* and *Milky*; likewise, how the liquors of *Plants* come to be white; what is a *Resin* properly so called; what a *Gum*; what a *Mucilage*.

5. The *Figuration of TRUNKS*; where he renders the cause of a *Shrub*, a *tall Tree*, a *slender*, and a *thick Tree*; as also of the roundness or angul'ariness of a *Tree*.

5. The *Motions of TRUNKS*: where occurs the cause of their *Ascent*, and *Descent* into the ground; their *Horizontal* and *Spiral* motion; and whence *Solar* and *Lunar* Plants are distinguished; some winding together with the *Sun* in its *Diurnal* motion, by *South* from *East* to *West*; and others with the *Moon* in its *Monthly* motion, from *West* to *East*.

7. The *nature of Trunks as variously fitted for MECHANICAL USE*: where he shows, whence woods are soft, whence fast, hard, clevesome, tough, or durable; why the *Heart of Timber* most durable; and why some *Trees* have *Heart*, and not others: Likewise, whence the toughness of *Flax*; and what sorts of *Plants* serve for the best *Tow*: Giving lastly an account, How all prosperous *Conjunctions* in *Grafting* may be known, and what is the chief *Use* of *Grafting*; viz, to accelerate the growth of good fruit.

III. *The ROYAL ALMANACK, &c.* by N. Stevenson,
one of his Majesties Gunners.

AS I was exceeding glad, to see this ingenious and truly useful Almanack begun to be publish't the last year; so I could not but give notice to the world of its continuation: Being chiefly a Diary of the true Places of the Sun, Moon, and the other Planets, their Rising, Southing, and Setting; High water at *London bridge*, with Rules to serve other places after the *New Theory* of Tides, and Directions of Sir *Jonas Moor*: To which are added the *Eclipses*, Tables of the Suns Rising, Moons Southing, Moons Rising and Setting; as also a Table of the *Suns* Right Ascension in Time for every Day at Noon, and of *Thirty one* of the most notable *Fixed Stars*: With the Moon and other the Planets Appulses to the Fixed Stars, for the Meridian of *London*, A. 1676. And lastly, instead of giving the impertinent gueffes of the Weather hap hazard, the Author gives notice of that useful Instrument the *Baroscope*, telling the changes of weather before-hand, even to admiration. All done with great pains and accurateness, according to the Rules of Art, for his Majesties Use, and at his Command, by *N. Stevenson*, one of his Majesties Gunners. Printed in *London* for the Company of Stationers, 1676. in 12°.

Note.

The Reader is desired to compare Mr. *Boyle's* Physico-Mechan. Experiments touching the *Air*, Exp. the 22th, p. 176. ff. with pag. 468. lin. 7. of this Treat.

Errata left uncorrected in *Numb.* 119.

Pag. 462. l. 31. r. *Bounds* for *Hunds*. p. 463. l. 15. r. *Wild boar*. *ibid.* l. 44. r. each such *churning*.

London, Printed for *John Martyn* Printer to the *R. Society*, 1675.